We claim:

1. A composite asymmetric microfilter structure comprising at least one separation membrane atop a support membrane, the support membrane being selected from the group consisting of silicon, silicon dioxide, silicon nitride, germanium and any combination thereof.

2. The structure recited in claim 1, wherein the at least one separation membrane comprises an inorganic material.

3. The structure recited in claim 2, wherein the inorganic material comprises an inorganic membrane material that will cleanly and efficiently transmit a permeate to a support layer.

4. The structure recited in claim 3, wherein the inorganic membrane material is selected from the group consisting of silicon, silicon dioxide, zeolite and any combination thereof.

5. The structure recited in claim 1, wherein the at least one of the at least one separation membrane comprises an organic material.

6. The structure recited in claim 5, wherein the organic material is a thermoplastic polymer.

7. The structure recited in claim 5, wherein the organic material comprises a polymer that will cleanly and efficiently transmit a permeate to a support layer

8. The structure recited in claim 6, wherein the thermoplastic polymer is selected from the group consisting of polyimide, SiLK, polysulfone, and polyethersulfone.

9. An array comprising a plurality of the composite microfilter stucture recited in claim 1.

10. The structure recited in claim 1, wherein the support membrane comprises a porous silicon wafer of dimensions standard in the microelectronics industry.

11. The structure recited in claim 1, wherein the separation membrane is about 1 μm thick or less.

12. The structure recited in claim 1, wherein the separation membrane is lithographically patterned with a plurality of micropores therethrough.

13 The structure recited in claim 12 wherein the support membrane is provided with a plurality of micropores therethrough having broader average diameter than the plurality of micropores of the separation membrane.

14. A process for fabricating a composite microfilter structure comprising:

etching a pattern of micropores through a standard-size semiconductor wafer to form a support membrane; and

providing at least one separation membrane atop the support membrane.

15. The process recited in claim 14, wherein the step of providing a separation membrane comprises providing an organic separation membrane.

16. The process recited in claim 17, wherein the polymer provided comprises a thermoplastic polymer.

17. The process recited in claim 15, wherein the organic separation membrane provided comprises a polymer that will cleanly and efficiently transmit a permeate to a support layer.

18. The process recited in claim 16, wherein the thermoplastic polymer is selected from the group consisting of polyimide, SiLK, polysulfone, and polyethersulfone.

19. The process recited in claim 14, wherein the step of providing a separation membrane comprises providing an inorganic separation membrane.

20. The process recited in claim 19, wherein the step of providing an inorganic separation membrane comprises providing an inorganic membrane that will cleanly and efficiently transmit a permeate to a support layer.

21. The process recited in claim 19, wherein the inorganic separation membrane is selected from the group consisting of silicon, silicon dioxide, zeolite and any combination thereof.

22. The process recited in claim 14, wherein the step of etching a pattern of micropores in a semiconductor wafer comprises dry etching a silicon-containing wafer by fluorine radicals in a plasma using TMDE.

23. The process recited in claim 19, wherein the step of providing an inorganic separation membrane comprises depositing an inorganic material by a method selected from the group consisting of CVD and plasma-enhanced CVD.

24. A process for fabricating a silicon oxide membrane for a composite asymmetric microfilter structure, comprising:

depositing a silicon oxide atop a support membrane by a method selected from the group consisting of CVD and plasma-enhanced CVD with a TEOS source;

depositing and curing a photoresist layer atop the silicon oxide;

providing the photoresist layer with a pattern for a plurality of micropores ;

exposing and developing the pattern in the photoresist layer;

transferring the pattern into the silicon oxide using a dry etch method; and

removing the remaining photoresist.

25. The structure recited in claim 1, wherein the at least one of the at least one separation membrane comprises a spin-on glass.

26. The structure in claim 25, wherein the spin glass is selected from the group consisting of siloxanes, silsesquioxanes, N-silsesquioxanes, and polycabosilanes.